CIVIL-STRUCTURAL
ENGINEERING NEWSLETTER
FOR
MILITARY PROGRAMS

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Look!!! New Criteria

Three new EIs have been placed on the CEHNC TECHINFO Web site: EI 11C101, dated 1 March 1997, entitled *Water Supply, Sources and General Considerations*; EI 11C103, dated 1 March 1997, entitled *Water Supply, Water Storage;* and EI 11C201, dated 1 March 1997, entitled *Wastewater Collection and Pumping*. See page 4.

WHAT'S INSIDE

VERY IMPORTANT NOTICE!!

The EIs are intended for all military projects.
See Ray's article on next page.

NEWSLETTER HIGHLIGHTS

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Responsibilities of Structural Engineers

Judging from the calls we receive here in headquarters, I feel there is a need to go over some of the most frequently raised issues. Although the following are addressed to structural engineers, they equally apply to other disciplines as well.

- As a structural engineer, it is imperative that you keep abreast of the latest changes in the regulations and design guidance documents such as AR's, ER's, TM's, EI's, etc. We routinely publish new developments in this newsletter as well as informing you via letters and other electronic media.
- Conditions under which a seismic evaluation is required for rehabilitation projects is provided in AR 415-15.
- Design loads such as wind or snow presented in various documents are minimum requirements. If your past experience with local conditions or your knowledge of project requirements indicate these values are too low, you should use higher values based on you judgement.
- Insufficient time to do a proper design is not an excuse for designing a structure that may lack structural integrity. If sufficient time is not allowed to do what you think is an adequate design, raise the issue with higher Engineering management and document your actions. Remember, you are responsible for the design you do, and hind sight is always 20-20! I have heard too many times the phrase "why didn't you tell me you needed more time ...," after a design deficiency had been discovered. This also applies to the review of design done by others.
- Under no circumstances are you to sacrifice structural integrity in name of "economy." You must resist pressure to cut corners or use substandard design to reduce the cost of a project. This does not mean gold plating the design, just sticking to your engineering principles and judgement.
- You must never buckle under pressure to design in violation of codes and design standards. As professional structural engineers, you are responsible for the life safety of those using the projects you design. □

EIs Intended For All Military Projects

The "Forward" page of the new Engineering Instruction (EI) needs a minor change. At the end of the first paragraph, the sentence "These engineering instructions are to be used as a guide when planning, programming, and designing military facilities at Army installations." should read "These engineering instructions are to be used as a guide when planning, programming, and designing military facilities." CEHNC is in the processing of revising all the EIs that have been published to date.

STRUCTURAL ENGINEERING
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Steel Recycling and Recovery

Modern technologies produce steel in two ways---Basic Oxygen Furnace (BOF) and Electric Arc Furnace (EAF), both of which require old steel to make new. The BOF process uses 25 to 30 percent old steel to make new, and produces products such as automotive fenders, encasements for refrigerators, soup cans, etc. The EAF process uses 100% old steel to make new, and produces products such as structural beams, steel plates, and rebars. According to Steel Recycling Institute's estimate, more than 70 million tons of steel were recycled in 1995. HQUSACE is planning to integrate ***Green Building*** concepts into Corps design guidance and construction documents. Changes are being made in guide specifications: CEGS 03200, Concrete Reinforcement, and CEGS-05120, Structural Steel, both of which will require the contractor to submit mill certificate attesting that the steel furnished contains no less than 25% recycled scrap steel and meets specification requirements. Reinforcing bars in the U.S. are produced mainly of scrap steel, so the 25% minimum limit is easy to achieve. ☐

Update of Roofing CEGS

In response to our customers' concerns with roofing problems, CEGS-07412, Non-Structural Metal Roofing, and CEGS-07416, Structural Standing Seam Metal Roofing, have been updated and revised recently with the roofing industry in support. In addition to technical updates, other improvements include providing a 5-year contractors' weather tightness warranty and a manufacturer's 20-year material warranty, and requiring shop drawings be provided by the metal roofing manufacturer for better quality control. CEGS-07413, Metal Siding, has been revised as well. ☐

Approved Standing Seam Metal Roof Systems

A complete listing of Standing Seam Metal Roof Systems which were tested and certified under the requirements outlined in CEGS-07416, Oct. 1991 is available. The listing includes test results and system sketches. If you need one, please E-mail Daniel Chen with your complete mailing address. ☐

Roofing Team Activities

Contributed by Ervell Staab, P.E., CEMRD-ET-E

I was recently asked by a district team member what could be done to become more active in assuring quality roof systems. A district roofing team could be responsible for assuring implementation of criteria, details, and specifications including:

- Reviewing all roofs within the district
- Providing local training and mentoring
- Maintaining liaison with other Corps team members
- Making R&D recommendations
- Suggesting improvements to the guide specifications
- Attending industry meetings and training
- Making construction site visits prior to, during and follow roof installation. This would help assure compliance with the contract documents, assure certified installation and monitor operating performance.

The above activities would take the equivalent of about one FTE for this vital task of reducing roofing problems for our customers. Much will depend on the workload and the needs of the particular district. These are my ideas. Feel free to share your thoughts among yourselves and with team members from other organizations. It is through this sharing that most can be accomplished. I will be happy to help in any way that I can. ☐

POCs for Roofing Design and Construction

We have created a Corps-wide network of expertise devoted to roof design and construction issues. Its purpose is to provide a rapid means for exchanging ideas, sharing experiences and lessons learned by using the Corps GroupWise E-mail system, or the Internet (at a later date). We have established a multi-disciplinary network made up of Architects, Civil and Structural Engineers from the Engineering and Construction Divisions of Corps districts and divisions, and we will form

various working groups to assist in revising and/or developing criteria for roof systems. A list of POCs is shown on page 7. You are encouraged to contact these individuals for answers to your roofing design and construction questions. ☐

Use of Cold Formed Steel

The moratorium on the use of cold formed steel remains in effect. Although AISI had promised to have a design manual along with specifications, example problems, and typical connection details submitted to the Corps for review by the end of June, they have not responded. We have been unable to obtain additional information from their office since the person handling this issue has left the AISI and has yet to be replaced. Others at AISI are not aware of the arrangements made with the Corps. With this turn of events, it appears improbable that any work will be submitted to the Corps any time soon. Until proper guidance can be developed, the use of cold form steel is restricted. ☐

Wind Analysis and Masonry Wall Design

Mr. Dave Boekholder of Eagle Point Software has informed us that software is available to solve wind analysis and masonry wall design problems. The Wind Analysis program calculates wind pressures and forces using ASCE 7-88 and ASCE 7-93 (formerly ANSI A58.1). It can be used for chimneys and tanks, roof pressure, tower guys, wall pressure, trussed towers, building components, open signs, building internal pressure, solid signs, monoslope and arched roofs. Masonry Wall Design for Windows can design both reinforced and unreinforced masonry walls according to the ACI 530-95, Masonry Code, and the Uniform Building Code (Allowable Stress and Slender Wall methods). In addition, you can design a cantilever wall, or a wall supported at the top and bottom. Support at the bottom can be pinned, fixed or partially fixed. The cost of this software is $350 for Engineers in the Corps. Eagle Point Software has home offices located at 4131 Westmark Drive, Dubuque, IA 52002-2627. Their Web site is at "http://www.eaglepoint.com". If you know anyone interested in this software, contact Eagle Point Software at (319) 556-8392 for additional information. ☐

Seismic Screening, Evaluation, and Rehabilitation

We receive many calls asking when seismic evaluation is required for renovation of existing buildings. AR 415-15, paragraph K-15, Mitigation of Seismic Risks, spells out the requirements. In general, seismic evaluation is required for all renovation work. Rehabilitation is required in most cases but there are conditions that allow work to be done without rehabilitation. These conditions are explained in AR 415-15. The procedures to be followed for screening and evaluation are given in EI 01S103 *Seismic Screening and Evaluation Procedures for Existing Military Buildings*, March 1997. ☐

TRANSPORTATION/GEOTECHNICAL ENGINEERING

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CEGS on Aggregate Base Course

CEGS 02233, *Graded Crushed Aggregate Base* and CEGS 02234, *Aggregate Base Course* have been combined and issued as CEGS 02722, *Aggregate Base Course*. This CEGS can be found at the TECHINFO web site.. The new specification number was required to follow the revised 1995 edition of MasterFormat, the standard numbering system developed by the Construction Specifications Institute (CSI). I have read through the new CSI numbering system and it looks like **all** specifications associated with pavements, geotechnical, and associated fields will need new numbers. The current plan is that as a CEGS is updated it will be assigned a new number. As we get information on the new numbers we will pass that information on to you. We will get the information out by multiple methods so that all affected parties are informed. ☐

Renumbered CEGS

CEGS 02552, *Bituminous Binder and Wearing Courses* has been renumbered and renamed to CEGS 02742, *Bituminous Binder and Wearing Courses, (Central Plant Cold Mix).* CEGS 02554**,** *Bituminous Road Mix Surface Course,* has been renumbered to CEGS 02744 with no title change. CEGS 02555, *Bituminous Surface Treatment,* has been renumbered to CEGS 02745 with no title change. CEGS 02560, *Bituminous Seal Coat, Spray Application,* has been renumbered to CEGS 02785 with no title change. CEGS 02564, *Cold Mix Recycling,* has been renumbered to CEGS 02965 with no title change. CEGS 02579, *Patching of Rigid Pavements,* has been renumbered to CEGS 02980 with no title change. CEGS 02594, *Sealing of Cracks in Bituminous Pavements,* has been renumbered to CEGS 02975 with no title change. CEGS 02596, *Heater Planning of Bituminous Pavements,* has been renumbered and renamed to CEGS

02966, *Hot In-Place Recycling of Bituminous Pavements.* ☐

1997 Geotechnical Conference

The 1997 Geotechnical Conference was held in San Bernardino, CA 7-11 July. Most of the conference was devoted to presentation of technical papers on (1) Civil Works Projects, (2) Military criteria and construction projects, and (3) Environmental projects. Highlights of the conference included opening remarks by Steve Stockton, Chief Engineering Division, Directorate of Civil Works; the Keynote address by Prof. J. Michael Duncan, VPI; and a luncheon address by Dr. Jim Davis, California State Geologist. The conference included a site visit to Seven Oaks Dam on the Santa Ana River; an earth and rockfill dam with a crest of 2,630 feet and a maximum embankment height of 650 feet. The dam is located on the San Andreas Fault System. ☐

ENVIRONMENTAL ENGINEERING

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New Washrack at ARCENT, Kuwait

A new vehicle washrack is under design at the U.S. Army Central Command (ARCENT) in Kuwait. Glenn Hordusky, CETAC-EC-TI, is coordinating the design with Gary Gerdes, CERL-UL-T. There is an existing washrack on site but it is inadequate for the new facilities being constructed. The new washing facility will have a larger capacity and will create fewer maintenance problems. It will be constructed in 2 phases, initially accommodating 20 tracked vehicles, with additional capacity provided later for 20 more vehicles. The scope includes hardstand areas with high pressure wash points, a waste oil collection system, a sedimentation basin with drive-in/clean-out operation, an oil/water separator, and a triplex water pumping system designed to provide a range of flows from 50-600 gpm. Washwater will first pass through the sedimentation basin to remove solids, and then be directed through the oil/water separator. Treated effluent will then be recycled back through the system to conserve water. Sludge solids will be dewatered in sludge drying beds. Each wash island will be equipped with lights for night operation. Anyone wanting more information may call Glenn at 540-665-4030. ☐

Fort Lewis Heat Recovery Incinerator

Once fully operational in 1998, the Fort Lewis Heat Recovery Incinerator (HRI) will save millions of dollars in recovered heat and energy costs, and will provide the Army with a showcase recycling center to help promote Green Building awareness. The Lewis HRI is an Army unique incinerator which was made possible by the extraordinary efforts of our champions in the Seattle District, with assistance from experts at the Construction Engineering Research Laboratory. After the contractor went bankrupt and all construction was terminated, the incinerator was mothballed for 6 years while funding was sought to complete the project. During that time, more stringent air quality regulations took effect, and several design modifications were required to retrofit the plant with newer, more effective emissions control systems. Final construction was completed in June of 1996, and the incinerator was started up for compliance testing. The existing recycling center adjacent to the post landfill was also upgraded and is now is capable of processing 35 percent of the solid waste stream, which will allow sorting and recycling of all wastes prior to incineration. With ever increasing restrictions on air emissions from incinerators, the recycle center expansion will help ensure compliance with current and future air quality regulations. Also, increased recycling of paper, plastic, aluminum, glass, and ferrous materials will emphasize the Army's commitment to Green Building concepts as required by Executive Order 12873. ☐

New Water and Wastewater EIs

The following Engineering Instructions have been finalized and are available for designers at the Huntsville Web site under TECHINFO: (a) EI 11C101 dated 1 March 1997 entitled *Water Supply, Sources and General Considerations*; (b) EI 11C103 dated 1 March 1997 entitled *Water Supply, Water Storage*; and (c) EI 11C201 dated 1 March 1997 entitled *Wastewater Collection and Pumping*. These documents are in PDF format and can easily be downloaded for use. ☐

New MIL-HBK on Wastewater Treatment

The Corps may adopt a new DOD MIL-HBK on wastewater treatment being developed by the Air Force. Myron Anderson, AFCESA, Tyndall AFB, funded development of the HBK with assistance from the Navy. Paul Steinbrecher of the nationally renowned design firm CH2M-Hill managed the development of the HBK and incorporated various Army, Air Force and Navy documents covering domestic wastewater treatment design. The HBK will include much Army relevant criteria presently

residing in TM 5-814-3, Domestic Wastewater Treatment. We plan on producing a small EI on wastewater treatment to cover Army unique subjects left out of the HBK. Joe Findly, Mobile District SAN-TCX, attended the technical meeting on May 8, 1997, at Tyndall AFB in Florida. ☐

CIVIL-STRUCTURAL NEWS WANTED

This newsletter is intended to be a forum for exchange of ideas and information. If you have any articles covering civil, structural, protective design, geotechnical, or environmental engineering related topics, that you think would be of interest to other Civil, Structural, Geotechnical or Environmental Engineers in the Corps, please FAX or E-Mail them to Ray Navidi, or any other CEMP-ET point of contact referenced in this newsletter. Also, if you have any suggestions for subject areas that you feel would be appropriate for this newsletter, please call any of the CEMP-ET points of contact to discuss your ideas. Our FAX number is 202-761-4139. ☐

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- Foundations & Materials; Structural Design; Military Ports; Welding; & Metal Buildings--Dan Chen (202) 761-4912.
- Protective Design Mandatory Center of Expertise (PD-MCX); Anti-Terrorism; Physical Security; Security Engineering; Ammunition Storage & Processing Facilities; Explosives Safety; Hardened Facilities; & Conventional Weapons Effects- Ray Navidi, (202) 761-1436.
- Seismic Technical Center of Expertise (S-TCX); Seismic Safety; Seismic Engineering; & Structural Design--Charlie Gutberlet, (202) 761-4802.
- Transportation System Mandatory Center of Expertise (TS-MCX); Airfields; Airfield Pavements; Roads & Railroads; Grading & Drainage; Utility Lines; & Soil Mechanics--Greg Hughes (202) 761-4140.
- Sanitary Engineering Technical Center of Expertise (SAN-TCX); Water Supply, Treatment & Distribution; Wastewater Collection, Treatment & Disposal; Solid Waste Management; Pollution Prevention (Green Building); Pollution Control; & Central Vehicle Wash Facilities--Fred Eubank, (202) 761-1128. ☐

Points-of-Contact for Roofing Design and Construction *(CEMP-ET, 28 April 1997)*

Name	Discipline	Office	Phone
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Ballard, John	Architect	CESAC-EN-DA	(803) 727-4214
Barker, Charles	Structural	CEHNC-ED	(205) 895-1657
Bourdo, John	Architect	CENWK-EP-DA	(816) 983-3236
Bousquet, Rick	Architect	CESAC-EN-P	(803) 727-4232
Brown, Ray	Architect	CEHNC-ED	(205) 895-1674
Butow, Robert	Construction	CENAB-CO-SQ	(410) 962-4887
Cozine, Larry	Architect	CEORL-	(502) 582-6964
Cumper, James	Construction	CENWD-ET-C	(402) 697-2530
Defont, Thomas	Mechanical	CENAP-EN-CQ	(215) 656-6621
Delaune, Curtis	Architect	CELMN-ED-GE	(504) 862-2702
Destefano, Peter	Construction	CENAN-CO-CQ	(212) 264-0123
Dismukes, Terry	Architect	CESAS-EN-DA	(912) 652-5544
Eidsmore, Alan	Architect	CENAB-EN-DA	(410) 962-6693
Fedele, Frank	Construction	CENED-CD-SE	(617) 767-9420
Ferguson, David	Architect	CELMM-ED-DM	(901) 544-0896
Gaumann, Carl	Architect	CENAD-ET-ET	(212) 264-7117
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Heitzmann, John	Construction	CELMS-CO	(314) 331-8135
Hill, Ralph	Construction	CEORL	(502) 582-5693
Hobbs, Steven	Structural	CENWK-EP-DS	(816) 983-3247
Hsiung, Chiway	Architect	CENED-ED	(617) 647-8617
Hyatt, John	Construction	CEHNC	(205) 895-1346
Janet, Andre	Construction	CENED-CO	(413) 593-6791
Kainth, Yashpal	Architect	CETAC-EC-TA	(540) 665-4067
Kellog, Sarah	Construction	CEMRO-CD-QC	(402) 221-4155
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Lam, Peter	Structural	CEPOA-EN-TE	(907) 753-5751
Lee, Jonathan	Architect	CESPL-ED	(213) 452-3611
Lewis, Richard	Architect	CEMRO-ED	(402) 221-4434

Likar, Frank	Civil	CEORP-ED	(412) 644-6843
Lopez, Severo	Specification	CEHNC-ED	(205) 895-1823
Marquardt, David	Architect	CEPOD-ET	(808) 438-2837
Martin, Eric	Structural	CENWO-ED-DE	(402) 221-4567
McCone, Christ.	Civil	CENAP-EN-CD	(302) 677-2122
Nakamoto, James	Architect	CENPS-EN-DB	(206) 764-3614
Pointon, Philip	Architect	CENAO-EN-DA	(757) 441-7701
Rumbaugh, Steve	Architect	CENWD-ET-E	(402) 697-2645
Santos, Julio	Construction	CENAN-CO-CQ	(212) 264-6173
Seals, Larry	Structural	CEORD-ET-EQ	(513) 684-3034
Senatra, Carmelo	Architect	CENCR-ED-DF	(309) 794-5254
Staab, Ervell	Structural	CENWD-ET-E	(402) 697-2643
Stanley, George	Architect	CENAN-EN-DA	(212) 264-9064
Thomas, Bill	Architect	CESAM-EN-DR	(334) 694-4089
Thornton, Russ	Architect	CENPW	(509) 527-7558
Tom, Robert	Structural	CEPOD-ET	(808) 438-8514
True, Kenneth	Civil	CENWD-ET-E	(402) 697-2608
Wojciechowski, S	Architect	CENAP-EN-D	(215) 656-6663
Wong, John	Civil	CENAN-EN-DS	(212) 264-5266
Woodward, Diane	Structural	CESAM-EN-DR	(334) 690-3247
Wortham, Robert	Construction	CESWF-EC-ST	(817) 978-4949
Young, Lawrence	Architect	CENAB-EN-DA	(410) 962-3770